REMARKS

In response to the above-identified Final Office Action, Applicants have amended claims 1 and 22 to address minor informalities. No new matter has been entered by way of these amendments. Applicants note with appreciation the Office's indication that claims 7-13, 15-17, 19-20 and 27-31 would be allowable if rewritten in independent form and that claims 33-35, 37-39 and 41 are allowed. In view of these above amendments and the following remarks, Applicants hereby request further examination and reconsideration of the application, and allowance of claims 1-35, 37-39, and 41-42.

The Office has rejected claims 1-6, 14, 18, 22-27 and 42 under 35 U.S.C. § 102(b) as being anticipated by the article "Multi-spectral color reproduction research at the Munsell Color Science Laboratory" to Berns et al. ("Berns") and has rejected claims 21, 32, and 41 under 35 U.S.C. § 103(a) as being unpatentable over Berns in view of U.S. Patent No. 5,949,914 to Yuen ("Yuen"). The Office asserts that Berns discloses a method for spectral imaging, comprising: capturing high spectral resolution data of at least a first portion of a first scene using a first plurality of channels (page 16, section 3, note that the first plurality of channels could be 61 channels); determining a first set of channels (minimum number of channels) from a second plurality of channels which can reconstruct spectral of the first portion of first scene (page 16, section 3, page 18) to satisfy a first error criterion when compared with the captured high spectral resolution data (Fig. 1, page 15-16, section 3, note that the error criterion is the least-square); and capturing pixel data of at least a second portion of at least first scene using the first set of channels (page 16-18, section 3, note that capturing or reconstructing at least a portion of pixel data is inherent when the portion of the image is reconstructed). The Office also asserts that Berns does not explicitly mention the number of first and second channels or subsystems are identical, but asserts that Yuen in FIG. 9a discloses using multiple identical channels or sub-imaging systems. Applicants hereby respectfully traverse the outstanding rejections for the following reasons.

Neither Berns nor Yuen, alone or in combination, disclose or suggest, "determining a first set of channels from a second plurality of channels which . . . satisfy a first error criterion" as recited in claim 1, or "a spectral processing system that determines a first set of channels from a second plurality of channels which . . . satisfy a first error criterion" as recited in claim 22. Computing the least-square matrix M as disclosed in the last paragraph on page 16 of Berns does not disclose or suggest determining a first set of channels

from a second plurality of channels which satisfy a first error criterion. The Office's attention is respectfully directed to Berns at the fourth full paragraph on page 16 through the first paragraph on page 17, where Berns discloses determining a spectral reconstruction ($f = \Phi\alpha + \mu_f$) for a sample (f) when a monochrome digital camera with seven different filters of differing spectral sensitivities is used to obtain the image data of the sample using seven channels (corresponding to each the filters). Berns states that "[f]or the multi-spectral camera, however, the spectral reconstruction needs to be based on the camera signals, s. This can be achieved by computing a least-square (5x7) matrix, M, to transform the camera signals into estimates of the scalar coefficients α." Referring to the top of page 17 in Berns, this results in changing the original spectral reconstruction ($f = \Phi\alpha + \mu_f$) shown above for the monochrome digital camera to a modified spectral reconstruction ($f = \Phi$ M s) suitable for reconstructing spectral data for a sample (f) imaged using a multi-spectral camera. As such, computing the least-square matrix M in Berns does not determine which of the seven filters out of a plurality of filters will satisfy a first error criterion. Furthermore, since Berns uses the same seven filters with a camera to obtain spectral data of a sample there is no need for Berns to determine which of the seven filters out of a plurality of filters will satisfy a first error criterion as claimed. Similarly, Yuen does not disclose or suggest determining a first set of channels from a second plurality of channels which satisfy a first error criterion as claimed.

The present inventors have recognized that for each object in a scene there is an optimally minimal number of channels with an associated transform which can be used for accurate spectral reconstruction of a scene. Some methods, such as the processes disclosed in Berns as discussed above, use a set number of filters to obtain image data through a corresponding set number of channels. Such an inflexible system uses the same number of filters for all of the objects or portions of a scene and for different types of scenes. However, the spectral characteristics of the objects within a single scene (or among a variety of different scenes) can vary such that using the same channels may yield inconsistent results. Therefore, other numbers and/or combinations of channels may need to be identified and tested to achieve a desired level of spectral image quality. As discussed in paragraph 23 on page 7, lines 19-25 of the above-identified patent application, "The spectral processing system 14 performs an iterative optimization determining a matrix which when applied to the captured pixel data from a set of channels, the closest reconstruction of the highly accurate spectra may be realized. The set with the smallest number of channels which can

approximate the highly accurate spectra across all captured pixels within an average spectral RMS difference that is less than the error tolerance e is chosen as the optimal set." Accordingly, the present invention does not just identify the set with the smallest number of channels, but determines the set with the smallest number of channels that also satisfies the chosen error tolerance. Thus, in view of the foregoing remarks, the Office is respectfully requested to reconsider and withdraw the rejection of claims 1 and 22. Since claims 2-21 depend from and contain the limitations of claim 1 and claims 23-32 depend from and contain the limitations of claim 22, they are distinguishable over the cited references and are patentable in the same manner as claims 1 and 22. As mentioned above, the Office has indicated that claims 33-35, 37-39 and 41 are allowed.

In view of all of the foregoing, it is submitted that this case is in condition for allowance and such allowance is earnestly solicited. In the event that there are any outstanding matters remaining in the above-identified application, the Office is invited to contact the undersigned to discuss this application.

Respectfully submitted,

Date: October 15, 2003

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